

REMARKS

The Office Action of April 23, 2004 has been carefully considered. In response thereto, the claims have been amended as set forth above. Reconsideration in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 1-4, 6 and 7 were rejected under 35 USC 103 as being unpatentable over Quigley in view of Ziegler. Claim 5 was rejected as being unpatentable over the same combination further in view of Ninomiya. The claimed have been amended to more clearly distinguish over the cited references. Reconsideration is respectfully requested.

In particular, the claims have been amended to recite that a first regulation signal, comprising a succession of pulses each of which has a width which is modulated according to a frequency difference between first and second input signals, is lowpass filtered to produce a filtered first regulation signal. Two current sources emit a charge current with a value which is variable according to the filtered first regulation signal. (See, e.g., page 6, lines 13-17 of the specification as originally filed.)

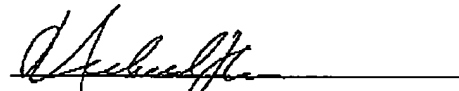
In accordance with this aspect of the present invention, the phase/frequency detector works at high frequency (e.g., up to 800MHz). The charge-pump, however, is essentially DC-controlled by the average value as a result of the lowpass filter inserted between the phase/frequency detector and the charge-pump. When the system is locked, the two input signals are 180 degrees out of phase. As a result, the first regulation signal has a 50% duty-cycle. The filtered first regulation signal is a substantially DC output signal corresponding to zero phase/frequency difference that causes both current sources to be turned ON at the same strength. Phase variations result a change in duty cycle which results in small changes to the filtered first regulation signal. As a result, the relative strengths with which the current sources are turned on are changed so as to return the system to a locked state.

The Harrison reference, cited but not explicitly relied upon in the Office Action, is believed to represent the closest prior art of record. In Figure 1 of Harrison, the charge pump is digitally switched ON/OFF at the frequency of the input signals. The charge pump therefore has to work at the same frequency as the input signal, resulting in a significant ripple component at the input signal frequency.

None of the prior art of record is believed to teach or suggest the invention as presently claimed. Accordingly, claims 1, 4 and 7 are believed to patentably define over the cited references.

Dependent claims 2, 3, 5 and 6 are also believed to add novel and patentable subject matter to their respective independent claims. Withdrawal of the rejection and allowance of claims 1-7 is respectfully requested.

Respectfully submitted,


Michael J. Uro, Reg. 33,089

Dated: June 15, 2004